October 31, 2002

Dr. Akira Tokuhiro, Reactor Director
Nuclear Reactor Facility
University of Missouri-Rolla
Rolla, MO 65401-0249

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO. 50-123/2002-201

Dear Dr. Tokuhiro:

This refers to the inspection conducted on September 30 - October 3, 2002, at your research reactor facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances of NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Programs
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-123
License No. R-79

Enclosure: NRC Inspection Report No. 50-123/2002-201

cc w/enclosure: See next page

cc:

A-95 Coordinator
Division of Planning
Office of Administration
P.O. Box 809
State Capitol Building
Jefferson City, MO 65101

Dr. Lee W. Saperstein, Dean
School of Mines and Metallurgy
305 McNutt Hall
University of Missouri-Rolla
Rolla, MO 65401

William E. Bonzer, Reactor Manager
University of Missouri-Rolla
Nuclear Reactor Facility
1870 Miner Circle
Rolla, MO 65409-0630

Mr. Tim Daniel
Homeland Security
Suite 760
P.O. Box 809
Jefferson City, MO 65102

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-123
License No:	R-79
Report No:	50-123/2002-201
Licensee:	University of Missouri-Rolla
Facility:	Nuclear Reactor Facility
Location:	Rolla, Missouri
Dates:	September 30 - October 3, 2002
Inspector:	Thomas F. Dragoun
Approved by:	Patrick M. Madden, Section Chief Research and Test Reactors Section Operating Reactor Improvements Programs Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Missouri - Rolla
Report No: **50-123/2002-201**

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the licensee's Class II non-power research reactor operation including: organization and staffing; operational logs and records; procedures; requalification training; surveillance and limiting conditions for operations; radiation protection, effluent controls, and ALARA programs; review and audit functions; security program; and the material control and accounting program.

Organization and Staffing

- The licensee's reactor operations organization and staffing remain in compliance with the requirements specified in Technical Specification Section 6. A change to the radiation safety organization described in the Technical Specification should be submitted for NRC approval.

Operational Logs and Records

- Records were kept in accordance with the requirements specified in Technical Specification 6.7.

Procedures

- The procedural control and implementation program satisfied Technical Specification requirements.

Operator Requalification

- Operator requalification was conducted as required by the Requalification Program.

Surveillance and Limiting Conditions for Operation

- The reactor was operated within the Limiting Conditions for Operations specified in the Technical Specifications.

Radiation Protection Program

- The radiation protection program satisfied NRC requirements.

Committees, Audits, and Reviews

- The review and audit program satisfied Technical Specification requirements.

Emergency Planning

- The NRC approved Emergency Plan was acceptably implemented.

Physical Security

- The security controls for the special nuclear materials satisfied the regulatory requirements.

Material Control and Accounting

- The licensee was acceptably controlling and tracking Special Nuclear Material as required by 10 CFR Part 70.

REPORT DETAILS

Summary of Plant Status

The licensee's 200 kW pool-type research reactor continues to be operated in support of graduate and undergraduate instruction, laboratory experiments, and reactor operator training. During the inspection the reactor was operated to support training.

1. Changes, Organization, and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69001)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Technical Specification (TS) Section 6.1, Amendment No. 18, dated February 8, 2000, were being met:

- Licensee submittal, "Annual Progress Report 2001 - 2002" dated April 25, 2002
- organizational structure
- management responsibilities
- staffing requirements for safe operation of the research reactor facility
- Console log "Permanent Log Book #12" entries from October 5, 2001, to October 2, 2002
- Standard Operating Procedure (SOP) 101, "General Operational Procedures" dated March 20, 1995

b. Observations and Findings

In a letter dated January 25, 1999, the licensee requested approval of an organization change that combined the positions of Reactor Director and Reactor Manager. This was approved by the NRC in Technical Specification (TS) Amendment No. 15 dated March 2, 1999. In letter dated January 26, 2000, the licensee requested that the two positions be re-established with revised qualification requirements. This was approved by the NRC in TS Amendment No. 18 dated February 8, 2000. The inspector reviewed the current staffing and qualifications of the incumbents and determined that the requirements of TS Amendment No. 18 were satisfied.

Licensed staff consisted of three Senior Reactor Operators, who are permanent staff, and three Reactor Operators who are students. A recent NRC license examination was held for three student candidates. The results were not available. However, the current staffing level of licensed operators was adequate to support the projected reactor operations schedule.

Records indicated that the staffing during reactor operations satisfied the requirements in SOP 101 Section B(2) and TS 6.1.3.

The licensee stated that the Health Physicist (HP) position described in TS 6.1.2, SAR Section 7.2, and shown in TS figure 6.1 was eliminated. The HP duties were assigned to the Radiation Safety Officer (RSO). This arrangement was confirmed in Section 2.4 “Health Physics” of the annual report dated April 25, 2002. The inspector stated that although this change did not appear to impact the radiation safety program, it should be submitted to the NRC for approval. Licensee action on this matter will be reviewed in a future inspection.

c. Conclusions

The licensee's reactor operations organization and staffing remain in compliance with the requirements specified in TS Section 6. A change to the radiation safety organization described in the TS should be submitted for NRC approval.

2. Operational Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that records were maintained as required by TS Section 6.7:

- Licensee submittal, “Annual Progress Report 2001 - 2002" dated April 25, 2002. This includes Table 3-3, “Maintenance” and a listing of Standard Operating Procedures revised during the reporting period
- Console log “Permanent Log Book #12" entries from October 5, 2001, to October 2, 2002
- Radiation Safety Committee (RSC) meeting minutes for the last two years
- Radiation survey and reactor system surveillance data for up to the last year
- SOP 106, “Permanent Log, Hourly Log, and Operational Data”, dated February 28, 1996

b. Observations and Findings

There were no reportable occurrences in the period April 2001 to date. Records were maintained in accordance with the administrative requirements. Logs and records were clear, well organized, and readily retrievable.

c. Conclusions

Records were kept in accordance with the requirements specified in TS 6.7.

3. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.3 were being met concerning written procedures:

- SOP 100, "Preamble" dated February 6, 1997
- SOP 101, "General Operational Procedures" dated March 20, 1995
- SOP 102, "Pre-Startup Checklist Procedure" dated February 16, 1998
- SOP 103, "Reactor Startup To Low Power" dated February 28, 1996

b. Observations and Findings

The inspector determined that written procedures were available for the activities delineated in TS 6.3 and were revised and approved by the Radiation Safety Committee as required. The inspector observed a reactor checkout and startup by students under the supervision of the Nuclear Reactor Director. The procedures were followed methodically and some steps were repeated several times when the student appeared unsure regarding the expected indications. The training emphasis on procedure compliance was noteworthy.

c. Conclusions

The procedural control and implementation program satisfied Technical Specification requirements.

4. Operator Requalification

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements in 10 CFR Part 55:

- "Operator Requalification Program" revision 2, dated May 1988, approved by NRC on August 15, 1988
- operator licenses
- operator training records
- operator examination records
- operator active duty status

b. Observations and Findings

Operator licenses for the three staff SROs were current. Records showed that operator training and examinations were consistent with the Requalification Program requirements. The console logbook date stamp was used by the operators to mark the quarterly table of required reactivity manipulations. This insured consistency of the records.

c. Conclusions

Operator requalification was conducted as required by the Requalification Program.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the surveillance requirements and limiting conditions for operations (LCO) specified in TS Sections 3.0 and 4.0 met:

- Console log “Permanent Log Book #12", data for October 5, 2001 to October 2, 2002
- SOP 111, “Measurement of Core Excess Reactivity and Determination of Shutdown Margin” dated March 30, 1994, recent data undated
- SOP 813, “Rod Drop Time Measurement” dated March 20, 1992, data for August 9, 2001, January 16 and March 1, 2002
- SOP 816, “UMRR Power Calibration” dated August 30, 1988, data for July 27, 2001, January 30 and July 23, 2002

b. Observations and Findings

Within the scope of this review, the inspector determined that surveillance, test and LCO verifications and calibrations were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed were complete and were being maintained as required. Checks, tests, and calibrations were completed as required by the TS.

c. Conclusions

The reactor was operated within the Limiting Conditions for Operations specified in the TS.

6. Radiation Protection Program

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20 and TS Sections 3.6, 4.6, and 6.3 requirements and commitments in Chapter 7 of the Safety Analysis Report:

- Low Enrichment Uranium Safety Analysis Report (SAR) revision 1 dated October 31, 1988, Chapter 7, “Radiation Safety Program”
- Internal letter from A. Adams, Health Physics Technician, to R. Bono, Radiation Safety Officer, “Ar-41 Release Verification” dated June 3, 2002
- Area and personnel OSD results for 2002 and 2001
- SOP 653, “Sealed Source Leak Test” dated March 20, 1995, data for November 17, 1999, April 27 and September 19, 2000, February 9, July 12, and December 18, 2001

- SOP 655, “Radiation Area Monitor (RAM) Calibrations” dated February 17, 1997, data for January 12, 1999, January 8, 2000, January 11 and December 10, 2001
- SOP 651, “Monthly Contamination Surveys” dated March 20, 1995, data for February 12, March 19, April 30, May 20, June 6, July 12, August 2, and September 10, 2002
- SOP 650, “Radiation Area Survey” dated March 2, 1995, data for February 15, March 22, April 19, May 3, June 11, July 12, August 1, and September 13, 2002
- SOP 652, “Pool Water Tritium Analysis” dated March 20, 1995, data for June 7 and December 19, 2001, and June 19, 2002
- Internal letter from W. Bonzer and L. Splitter to the Chairman of the Radiation Safety Committee, “ 2001 Audit of UMRR Radiation Protection and ALARA Programs” dated January 30, 2002

b. Observations and Findings

The inspector determined that the controls, warning signs, and postings were appropriate for the radiological conditions reported during the routine radiation surveys. Dosimetry results showed that personnel doses were not detectable above background or well below the NRC annual limit. Area dosimeters located in the controlled spaces recorded no detectable dose except for the dosimeter positioned over the reactor pool. The area radiation monitors were maintained and calibrated as required. A documented annual review was conducted as required by 10 CFR 20.1101.

There was no liquid effluent discharged from the facility. All potentially contaminated water was processed and reused.

Licensee calculations showed that airborne releases of Argon-41 were below the constraint provided in 10 CFR 20.1101(d). However, the inspector noted that the Argon-41 concentration limit found in SAR Section 7.6.1 had been superceded and recommended that this section be revised. This SAR section was referenced in the “Basis” of TS Sections 3.6.2(1) and 4.6.2(1).

The inspector noted that the leak check records for sealed radiation sources included a source with serial number 5049, which was actually a source holder (mounting). The Reactor Manager made pen and ink changes to the procedure and records to clarify this matter.

The licensee has a student design project underway to develop a robot to perform the annual visual inspection of the reactor control rods. This routine inspection activity resulted in the highest dose to the staff. This project constitutes a commendable ALARA activity.

c. Conclusions

The radiation protection program satisfied NRC requirements.

7. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in the requirements of TS Section 6.2 and 10 CFR 50.59 were being completed:

- Radiation Safety Committee (RSC) meeting minutes for June 22, September 13, and December 13, 2001, and March 6, May 17, and July 15, 2002
- Independent audit reports dated November 20, 2000, and December 28, 2001
- 50.59 review of new nuclear instrumentation safety channels and control rod magnet power supplies dated April 26, 2002, approved by RSC on May 17, 2002
- 50.59 review of a change to the reactor pool water demineralizer from regenerating to non-regenerating resin, approved by the RSC on March 11, 1998

b. Observations and Findings

The composition and meeting frequency of the RSC satisfied the TS requirements. The minutes of the meeting indicated that the RSC provided the review and oversight required by the TS.

The design change review for the replacement of the nuclear safety channels was thorough, well documented, and included a detailed operability testing program for the new equipment.

c. Conclusions

The review and audit program satisfied Technical Specification requirements.

8. Emergency Planning

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify the implementation of the emergency preparedness:

- Emergency Plan revision 6, dated December 30, 1994
- Critiques of building evacuation drills held April 27 and October 31, 2001, and May 20, 2002
- SOP 501, “Emergency Procedures for Reactor Building Evacuation” revision 7 dated July 29, 1997

- SOP 502, “Emergency Procedures for an Unusual Event” dated December 28, 1994
- Letters of Agreement for emergency support from:
  - Phelps County Regional Medical Center dated October 11, 1982
  - Fire Protection Department dated March 21, 1988
  - Missouri State Highway Patrol dated December 1, 1994
  - Rolla Police Department dated December 1, 1994
  - Phelps County Sheriffs Department dated December 1, 1994

b. Observations and Findings

The inspector noted that Section 3.2 of the Emergency Plan requires notification of the NRC Region 3 Regional Administrator. The inspector advised the licensee that notification of emergencies must now be made to the NRC Operations Center in Rockville, Maryland.

Drill critiques indicated that the Emergency Plan was properly implemented for building evacuations.

The inspector noted that the Letters of Agreement were old. The Reactor Manager stated that instead of updating the letters, the police and firefighters receive annual emergency training at the reactor facility. However, detailed records of the personnel trained was not kept.

c. Conclusions

The NRC approved Emergency Plan was acceptably implemented.

9. Physical Security

a. Inspection Scope (IP 81431)

The licensee does not have an NRC-approved security plan and none was required. However, the licensee must meet the general provisions of 10 CFR 73.67(f). The inspector accompanied the Reactor Manager on a tour of the facilities existing and proposed security features.

b. Observation and Findings

Access controls, barriers, and intrusion detecting systems were in place. The Reactor Manager stated that terrorist attack scenarios were considered and resulted in the placement of additional barriers.

c. Conclusion

The security controls for the special nuclear materials satisfied the regulatory requirements.

10. Material Control and Accounting

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- Nuclear Material Transaction Report (DOE/NRC Form 741) dated October 18, 1999
- Material Status Report (DOE/NRC Form 742) dated October 11, 2000, April 2 and October 11, 2001, and April 4, 2002
- Inventory Composition Report (DOE/NRC Form 742C) dated April 2 and September 30, 2001, and March 31, 2002

b. Observations and Findings

There were no shipments or receipts of special nuclear material for several years. The licensee calculates and reports the burn-up of uranium-235 in the annual Progress Report. When the total burn up exceeds the reporting threshold (1 gram of U-235), a form 741 was filed. This last occurred on October 18, 1999.

Material Status Reports and Inventory Composition Reports had been completed semiannually and submitted by the licensee to the appropriate regulatory agencies in a timely manner and as required by 10 CFR 74.13(1).

c. Conclusion

The licensee was acceptably controlling and tracking Special Nuclear Material as required by 10 CFR Part 70.

11. Exit Interview

The inspection scope and results were summarized on October 3, 2002, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

A. Tokuhiro	Reactor Director, UMRR
W. Bonser	Reactor Manager, UMRR
J. Jackson	Senior Laboratory Mechanic
B. Porter	Senior Electronics Technician

INSPECTION PROCEDURE (IP) USED

IP 69001	Class II Non-Power Reactors
IP 81431	Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance
IP 85102	Material Control and Accounting - Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

PARTIAL LIST OF ACRONYMS USED

LCO	Limiting Conditions for Operations
NRC	Nuclear Regulatory Commission
OSD	Optically Stimulated Dosimetry
RO	Reactor Operator
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
SNM	Special Nuclear Material
TS	Technical Specifications
UMRR	University of Missouri Research Reactor